Planar lipid bilayer as model of cell membrane exposed to electric field

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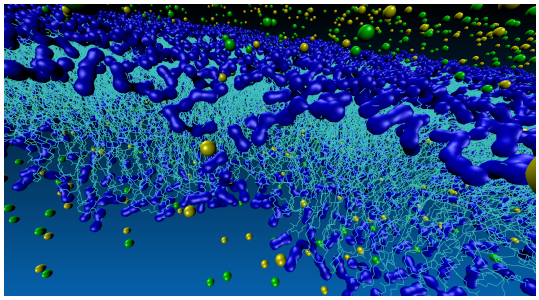

Abstract:
The application of pulsed electric fields to biological cells has emerged as a powerful technique for manipulation of cell membrane permeability, with wide-ranging use in biomedical and biotechnological applications. Pulsed electric field (i.e. applied electric pulses), induces local distortions and structural rearrangements of lipid molecules in the cell membrane. As a result, the membrane becomes transiently permeable even after the external field is removed, allowing otherwise impermeant molecules to cross the membrane and reach the cytosol. This phenomenon is often referred to as electroporation or electropermeabilization. Experimentally formed planar lipid bilayers can be considered to be a small model of a cell membrane assembled in laboratory conditions It is often used to study electroporation phenomena because it is electrically accessed from both sides and can be represented by an electrical model of resistor and capacitor wired in parallel. The measured results can be compared to Molecular Dynamics simulation studies of planar lipid bilayers.

Biosketch:
University of Ljubljana, Faculty of Electrical Engineering, Slovenia. He received a B.S., M.S. and PhD degree in Electrical Engineering from the University of Ljubljana. He has been active in the area of electroporation for over 10 years. His research field are planar lipid bilayers. He developed electronics for measuring properties of planar lipid bilayer. During the years, he performed experiments on planar lipid bilayers of various lipid mixtures and establishments. He uses Molecular Dynamics simulation studies to support experimental results. From the early beginning, he is a chair of the organising committee of International scientific workshop and postgraduate course "Electroporation-Based Technologies and Treatments".

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